

Remarks

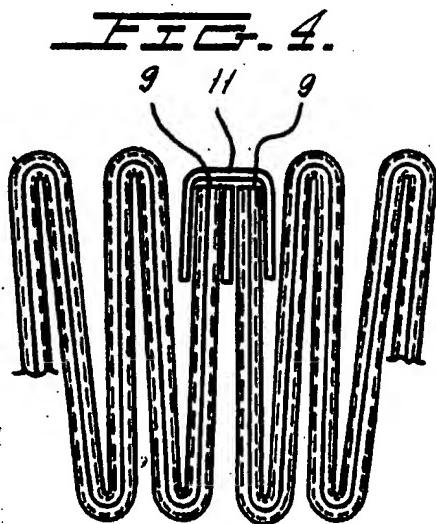
The various parts of the Office Action are discussed below under similar headings.

Claim Objections - 37 CFR 1.75

Claims 64 and 65 are objected to as being "substantial duplications" of claim 1. The Examiner is asked to please note that claim 1 specifies a microfilter element for removing impurities in the range of about 0.5 μm to about 25.0 μm from **aviation fuel**, claim 64 specifies a microfilter element for removing impurities in the range of about 0.5 μm to about 25.0 μm from **hydrocarbon fuel**, and claim 65 specifies a microfilter element for removing impurities in the range of about 0.5 μm to about 25.0 μm from **fuel**. Accordingly, it is respectfully submitted that these claims are not "standard duplications."

Claim Rejections - 35 USC § 102

Claims 20, 22 and 25 have been rejected as being anticipated by U.S. Patent No. 4,588,464 to Miyagi. Miyagi discloses a filter element made wholly of fluorocarbon resin consisting of a filter membrane 1 and two net supporters 2 between which the filter membrane 1 is sandwiched. (See Miyagi Figure 2, below.) The edge parts 9 of the filter membrane are joined together by placing a strip of sealing tape 10 followed by integrally welding (see Miyagi Figure 3, below) or by covering the edge parts 9 with a sealing cover 11 followed by integrally welding (see Miyagi Figure 4, below).



Claim 20 now sets forth that the adhesive bead has a continuous mass which encapsulates all of the layers in the distal ends of the end pleats and extends radially inward between the respective sidewalls of the end pleats. Claim 22 further sets forth that this continuous mass extends circumferentially between the radially outward peaks of the two end pleats. Claim 25 now sets forth that the adhesive bead has a continuous mass which extends radially inward between the endmost sidewalls of the end pleats and circumferentially between endmost radially outward peaks of the two end pleats.

It is respectfully submitted that Miyagi does not show or suggest an adhesive bead and/or continuous mass. Instead, its teachings are directed towards the use of sealing tape to form the filter's side seam. Further, the strip of tape 11 does not encapsulates all of the layers in the distal ends of the end pleats and does not extend circumferentially between the radially outward peaks of the two end pleats. Whatever "encapsulation" and "circumferential extension" the strip of tape 11 may allegedly perform, it does not extend radially inward between the endmost sidewalls of the end pleats. Two separate strips of tape are required in the Miyagi seam.

Claim Rejections - 35 USC § 103

Claims 1-3, 10, 18-19, 39-45, 53-58, and 64-65 have been rejected as being unpatentable over U.S. Patent No. 5,690,765 to Stoyell. Stoyell discloses a filter including a cylindrical pleated filter element 10 having a plurality of longitudinal pleats 11. In one embodiment of the Stoyell invention, a wrap member 50 comprising a parallel-sided strip of a flexible material is helically wrapped about the filter element 10 in a plurality of turns, with or without overlap between adjacent turns.¹ (See Stoyell Figure 22, below.)

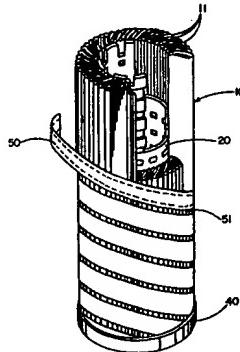


FIG. 22

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1. For example, adjacent turns of the wrap member 50 can abut each other with substantially no overlap, or by employing an overlap, it is possible to wrap multiple layers of the wrap member 50 around the filter element 10.

Claim 1 (and claims 2-3 depending therefrom), claim 64, and claim 65 each set forth that the support screen provides at least 50% open flow area. In contrast, the Stoyell patent specifically notes that:

To prevent the wrap member 50 from becoming loaded, the size of the openings of the wrap member 50 should be large enough to allow the passage of virtually all of the particles contained in the fluid being filtered. Furthermore, the total area of the openings is generally less than 50% of the total surface area of the cylindrical surface defined by the peaks of the pleats 11 of the filter element 10. More preferably, the total area of the openings is in the range from about 6% to about 30% of the total area of the surface defined by the peaks of the pleats 11.²

Claims 1, 64, and 65 also set forth that the support screen provides a tight array of attachment points so that the filter media is sufficiently supported without having cellulose-fiber and/or woven-mesh endoskeleton support layers. Claim 10 (and claims 53-58 depending therefrom) sets forth that the exoskeleton support structure is attached to the radially-outer peaks (and/or the radially-inner peaks) in such a manner that the filter media is sufficiently supported without cellulose-fiber and/or woven-mesh endoskeleton support layers. Stoyell does not provide any insight on the filter media being sufficiently supported and, in fact, teaches that its drainage layers 13 and 14 can be in the form of a mesh or screen, such as a metallic mesh or screen.³

Claim 18 (and claim 19 depending therefrom) sets forth that the filter media has a pleat density of about 8 or more pleats per inner diameter inch and now also sets forth that the height of each pleat is substantially equal or less than the difference between the outer diameter and the inner diameter. In other words, the pleats are not in a "laid-over state" as in the Stoyell filter (which, according to the Examiner, "provides the greatest amount of pleats per inner diameter inch") and a high pleat density is still provided.

Claim 39 (and claims 40-45 depending therefrom) sets forth that the support screen comprises a sheet of screen material having a width approximately equal to the axial dimension of the filter media and a length approximately equal to the circumferential dimension of the filter media plus a seam allowance. This claim also

2. Stoyell, column 18, lines 20-29.

3. This implies that the filter media would not be sufficiently supported by the exoskeleton support structure.

specifies that the sheet of screen material has lateral edges joined together at a side seam. The Examiner appears to admit that the Stoyell helical wrap does not show or suggest such dimensions and/or such a side seam, however, he contends that this reference's teachings regarding "circumferential" wraps essentially teaches the same thing.

It is respectfully submitted that Stoyell does not show or suggest the claimed screen. Stoyell does teach that "[a]lternatively, the wrap member 50 could be wrapped around the filter element in the circumferential direction rather than the helical direction."⁴ But this teaching simply seems to relate solely to the orientation of the turns of the wrap (sloping vs. straight) rather than the replacement of the wrap with sheet of screen material. Stoyell also comments that "[i]nstead or in addition to the septum being attached directly to the filter element 10, if there is overlap between adjacent turns of the septum 50, the **adjacent turns** can be attached directly to one another by welding or bonding, for example."⁵ The phrase "adjacent turns" clearly implies that the reference is not suggesting the use of a sheet of screen material having a width approximately equal to the axial dimension of the filter media and a length approximately equal to the circumferential dimension of the filter media plus a seam allowance. Moreover, Stoyell's welding/bonding attachment of the turns is meant to replace attachment of the wrap to the filter media, whereby it would not be "thermal bonded to the each of the radially-outer peaks" as is also set forth .

Claim 39 further sets forth that the support screen is further defined as being thermally bonded to each of the radially-outer peaks (or each of the radially-inner peaks), thereby exoskeletonally supporting the pleats in a **spaced** and non-collapsed condition. The Stoyell patent is specifically directed towards a filter element with "laid-over" pleats; that is, "unspaced" pleats; and any exoskeleton support of these pleats is intended to maintain them in this unspaced condition.⁶

Claims 4-5, 26 and 59-63 have been rejected as being unpatentable over Stoyell in view of U.S. Patent No. 5,552,048 to Miller. Miller discloses a cylindrical filter having a wrap member 70 in the form of a strip 71 of mesh, which is wrapped spirally around a

4. Stoyell, column 18, lines 65-67.

5. *Id.*, column 23, lines 9-13.

6. The Examiner contends that it is considered "spaced" to be any point of distance including close to zero. Be that as it may, the purpose of the Stoyelle wrap is to maintain the pleats in an "non-spaced" condition and laid-over state.

filter element, whereby the openings in the wrap member 70 are constituted by the mesh openings 72. (See Miller Figure 9, below.)

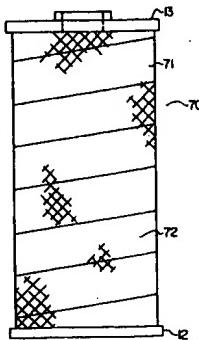


FIG. 9

Claim 4 (and claim 5 depending therefrom) sets forth that the support screen comprises a thermal-bondable mesh having cords that form a grid of approximately about 0.060 inch to about 0.150 inch by 0.060 inch to about 0.150 inch openings, which are aligned with a longitudinal axis of the filter media.⁷ Claim 26 (and claims 59-63 depending therefrom) sets forth that the support screen has a first set of cords extending in a first direction, a second set of cords extending in a second direction and intersecting with the first set of cords, and openings defined therebetween.⁸ The Examiner proposes that the Stoyell helical wrap simply be replaced by the Miller wrap and then the size of the openings be reduced to the claimed range as they are "optimum values of a result effective variable which depends upon the filter being filtered, desired flow rate through the support screen and other factors."

While the Examiner's proposed replacement and/or reduction may now be easily articulated with the hindsight of the present invention, the applied art does not in any way direct one of ordinary skill in the art towards these "optimum" values. Also, as was noted above, Stoyell specifically teaches that "the total area of the openings is generally less than 50% of the total surface area of the cylindrical surface defined by the peaks of the pleats 11 of the filter element 10" and, "[m]ore preferably, the total

7. It is noted that claim 4 depends from claim 1, and that Miller does not cure the shortcomings of the Stoyell reference discussed in connection with this base claim.

8. Adjacent cords in the first set are separated from each other by a distance d_1 , adjacent cords in the second set are separated from each other by a distance d_2 , and adjacent radially-outer peaks are separated from each other by a distance d_{pleat} . The distance d_1 between the first set of cords is about half to about twice the distance d_{pleat} between adjacent radially-outer peaks.

area of the openings is in the range from about 6% to about 30% of the total area of the surface defined by the peaks of the pleats 11."

Claims 6-7 have been rejected as being unpatentable over Stoyell in view of U.S. Patent No. 4,588,797 to Miyagi; claim 23 has been rejected as being unpatentable over Miyagi in view of Stoyell. As was explained above, Miyagi does not show or suggest "an adhesive bead which encapsulates all of the layers in the distal ends of the end pleats." Also, claims 6-7 depend from claim 1 and claim 23 depends from claim 20 and these claims do not cure the shortcomings of the base references.

Allowable Subject Matter

The indicated allowability of claim 46 and the allowance of claim 52 is noted with appreciation. By the present amendment, claim 46 has been placed in an independent format, whereby this claim is now believed to be in a condition for allowance.

Conclusion

This application is now in condition for allowance and an early action to that effect is earnestly solicited.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By Cynthia S. Murphy
Cynthia S. Murphy, Reg. No. 33,430

1621 Euclid Avenue
Nineteenth Floor
Cleveland, Ohio 44115
(216) 621-1113

CERTIFICATE OF MAILING (37 CFR 1.8a)

I hereby certify that this paper (along with any paper or thing referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: June 5, 2003

Marian E. Vasquez
Marian E. Vasquez